

1                   **PROTECTIVE CUSHION AND COOPERATIVELY**  
                  **ENGAGEABLE HELMET CASING FOR ANESTHETIZED PATIENT**

6                   **BACKGROUND OF THE INVENTION**

1. Field of the Invention

          The present invention relates to a safety helmet for  
cranial protection. More particularly it relates to a modular  
helmet apparatus constructed of interchanging cooperative  
11 components of differing sizes which provide a prophylactic  
cushion and helmet to be worn by patients undergoing general  
anesthesia to prevent eye, skin, or other nerve damage from  
prolonged pressure upon areas of the head as well as to  
provide a safer manner for cranial manipulation during  
16 surgery.

2. Prior Art

          Surgeries upon patients in the prone position present a  
number of patient care challenges to the anesthesiologist and  
surgical staff. Once a patient undergoing a surgery requiring  
21 general anesthesia is anesthetized, that patient is  
essentially in a coma like state. In such a state, noxious  
stimuli to the patient's body and skin, such as pressure or  
pain, which would normally cause an awake patient to move to  
relieve the stimulus, no longer causes such a reaction.  
26 Consequently, patients under general anesthesia are especially  
threatened by a number of factors, other than the surgery  
itself, which arise during such surgical procedures.

1        One hazard which requires constant vigilance by the  
surgical staff to protect against injury is the threat of eye  
damage. Inadvertent pressure upon the ocular structures of a  
patient for just a matter of minutes can cause extreme damage  
or blindness to the eye. As noted above, because the  
6 anesthetized patient is in a coma like state, the discomfort  
of facial compression upon the eye, which would normally cause  
an awake patient to move and relieve that pressure, fails to  
alert the anesthetized patient. Care must be taken by an ever  
alert surgical staff to inspect for possible pressure points  
11 about the ocular structures of the patient and to move the  
patient's face to prevent eye damage.

Other compression injuries can occur to the anesthetized  
patient's forehead and chin areas. Here again, the constant  
pressure upon those areas, caused by the weight of the  
16 patients own head, if not relieved by movement of the face to  
allow blood flow thereto, can cause localized ischemia to the  
chin and forehead area. Since the anesthetized patient does  
not react to the body's cues of discomfort preceding injury,  
the risk of harm in a matter of minutes to these areas is  
21 great.

An additional concern during surgical procedures of the  
anesthetized patient is the decrease in body temperature that  
can occur during surgery. Currently bulky warmed towels and  
electric blankets are used in an attempt to warm the patient.  
26 Such endeavors crowd the operating field and are not easily

1 controlled for temperature.

Currently, there are a number of conventional methods to support the head and protect the eyes and face of a patient from compression injuries during surgery which require the patient to be placed in a prone, face down, position for the long periods of time involved in surgery. One method conventionally used is placement of the patient's head and face in a horseshoe shaped frame supporting a foam pillow which holds the patients face off of the operating table in a supported manner. The patient's eyes are generally taped shut when such a structure is used to keep them from contact with the foam and to prevent eye fluid drainage. This frame and pillow support however has inherent hazards of its own in that it cannot distribute pressure maximally over the surface of the head. Further, great care must be taken by the anesthesiologist and staff to make sure that any anesthetic equipment, such as endotracheal tubes, esophageal stethoscopes, or electronic sensing devices, are not dislodged or disrupted by gravity or patient positioning during the term of the surgical procedure. Such disruption or dislodgement of surgical equipment can cut off the air supply to the patient or lead to inaccurate readings by monitoring equipment.

Another method is simply to place the patient's face sideways on a pillow or towel located upon the surgical table. However, this method suffers from the danger of tubing collapse due to the patient's head weight, and even a face or

1 eye supported by a foam pillow may be damaged if the pressure  
is uneven and remains on one area too long. Further, the  
placement of the patient's face on a towel requires the head  
to be turned one way or the other, placing pressure on one  
side of the face which, as noted earlier, subjects the patient  
6 to the potential of injury. Additionally, blood flow through  
the veins and arteries of the neck may be impaired by this  
twisted fashion of head support. Hazards to the patient  
increase if the surgery requires a face down posture because  
the danger of tube collapse from pressure or bending increases  
11 with the tubes entering the patient's body through the mouth  
or nose being compressed between the patient's face and the  
operating table. With the entry points to the head out of  
view, such constrictions of the tubes also remain out of  
sight.

16 A further challenge facing surgical teams during surgery  
on anesthetized patients is the seemingly simple task of  
rolling the patient over from a supine position to a prone  
position on the operating table or from a cart onto the  
operating table. Generally, the patient at this point in the  
21 surgical procedure is already intubated, asleep, and basically  
"dead weight." In this physical state, the patient is at  
great risk of injury during the roll over procedure,  
especially to the neck area. Additionally vexing to the  
surgical staff is the fact that the patient, with tubes  
26 exiting the mouth and/or nose, must be rolled over, without

1 disturbing the tubes and without injuring the neck.

Concurrently during the roll over procedure, the surgical staff must plan ahead so that when the patient is placed face down on an operating table, the face is properly aligned with, and inserted upon or into the pillow, already located upon the

6 table. This insertion of the face into the pillow is conventionally done without the benefit of a pre surgery fit to make sure the face and pillow and frame mate in a manner that will accommodate the patient for the term of the surgery and protect the face from compression injury. Heads and  
11 faces being quite different amongst people in general, an optimum fit between face and pillow is achieved only a small percentage of the time. Once in this prone position, the danger of injury remains constant and continued and consistent vigilance by the surgical staff is required to ascertain, that  
16 in fact, the patient's airways are open, the eyes are not compressed, and the face is not being subjected to pressure at any point for a duration sufficient to cause nerve damage.

Finally, when the operation is over, the patient must again be moved off of the operating table and is generally  
21 rolled over onto a gurney in a reverse roll over procedure. Still anesthetized, the patient is at great risk of injury to the neck if the head is not adequately supported and manipulated during this roll over process.

Still further, if an emergency develops while the patient  
26 is in the face down prone position, requiring the patient to

1 be rolled to the supine position, valuable life saving time  
can be lost trying to upright the patient without injury to  
the neck, and without crimping the airway supply tubing and  
monitoring equipment communicating through the nose and mouth  
of the patient.

6 Further, patient size is also a factor in the fitting of  
facial and head support. A child may have a very small face  
and head and an adult a large one. Conversely, a large child  
may have a head and face requiring support in areas much  
different from a small stature adult.

11 U.S. Patent 5,220,699 (Farris) teaches an inflatable  
pillow mounted inside a mask for variable support of differing  
sized patients. However Farris requires the use of an  
inflatable chamber which as taught is inflated once the  
patient has already been rolled to the prone position. It  
16 requires an air inflation device to function and lacks the  
ability for an easy installation prior to surgery and will not  
function without compressed air.

U.S. Patent 4,400,820 (O'Dell) teaches an apparatus using  
pads and having a "T" shaped void which may be used in  
21 combination with a support structure to hold the patient's  
head. However, O'Dell does not allow for pre-fitting and pre-  
installing the protective device prior to surgery and does not  
aid in protecting the patient during roll over on and off the  
table.

1 U.S. Patent 5,214,815 (Agbodoe) teaches a surgical  
headrest with a removable foam pad; however, Agbodoe does not  
provide any manner to pre-fit and install the device on the  
patient prior to being asleep and it mounts to the table and  
is intended for use after roll over thereon.

6 U.S. Patent 4,757,983 (Ray) features a pair of cushions  
attached to a horseshoe-shaped frame for surgical head  
support. However Ray also suffers from an inability to pre-fit  
and install the device on patients prior to surgery while they  
are awake as well as lacking any protective ability during  
11 dangerous roll over onto the table and like the aforementioned  
prior art, lacks the ability to see the patient's eyes and  
face from the side or from above.

As such, there exists a need for a support device that is  
easily modified to fit a variety of patients of differing  
16 size, and that may be pre-fit to the patient prior to surgery  
while the patient is alert and able to ascertain the comfort  
or discomfort level of the device. Further such a device  
should provide an additional manner to support the head and  
maximally diffuse pressure over a large area while helping  
21 prevent patient thermal heat loss during surgery, as well as  
during the hazardous movement of the patient prior to and  
after surgery. Such a device should also provide for easy  
viewing of the patient's eyes and nose from a side and top  
view during the operative procedure so that the patient may be  
26 continually monitored by the staff.

1       A further need exists for such a device that may be  
cooperatively engaged with a positionable mount or used by  
itself if needed yet still provide a view of the eyes and  
ocular area of the patient from looking inward from the side.

6                               **SUMMARY OF THE INVENTION**

      The present invention relates to a new and improved  
protective helmet apparatus which provided functionally  
through the ability to vary the configuration for the physical  
characteristics of patients undergoing general anesthesia  
11 during surgery, and provide optimum cranial support to the  
patient using differing configurations of the various parts of  
the device. Concurrently, the device, when using a  
substantially transparent helmet casing and operatively placed  
apertures provides the medical professionals operating on the  
16 patient, easy viewing of the patients facial features and easy  
access to the nasal and oral passages of the patient in either  
the prone or supine position. The device is best made of  
modular construction allowing for the substantially  
transparent helmet casing to fit a variety of different sized  
21 patients. Interchangeable and replaceable cushions of  
variable dimensions on one surface to accommodate different  
patient facial structures are positionaable in a plurality of  
interchangeable light weight helmet casings. The cushions on  
their exterior surface are dimensioned for a registered fit  
26 with the helmet casing surface and apertures in the cushion



1 register with apertures in the helmet casing. The cushions  
can also be color coded to designate different sizes to  
accommodate different sized patients. If desired, while not  
the best mode for maximum support and positioning, the  
cushions themselves can be used without the helmet casing, yet  
6 still provide a side view of the patient's eyes and temple  
area during the procedure through an aperture communicating  
through a sidewall to the face of the patient. Such might be  
the case in emergencies when sufficient helmet casings are not  
available or when a low mount of the patient's head is  
11 desirable.

The device is especially useful in that it allows for  
pre-fitting of the patient while the patient is awake and  
alert using modular pads of differing facial dimensions and  
having a rear or mask side dimension configured to fit into a  
16 registered position in the helmet casing. While the current  
best mode combines the proper sized cushion with the  
appropriate helmet casing for a mount on the table surface,  
even using the facial cushion by itself, if desired, yields a  
substantial increase in utility over prior art due to the  
21 viewing of the patient's eyes and temple area from the side  
afforded by the apertures therefor. The device having the  
pre-fitted cushions or pads mounted into the helmet casing,  
and featuring appropriate indentations on the facial contact  
surface, evenly diffuses pressures on the face of the wearer  
26 and may be worn into surgery such that the surgical team need

1 not worry about trying to fit the patient with pillows or pads  
in a table mounted frames after the patient is asleep.

For use in a variety of patients in prone or supine  
positions during surgery the various embodiments of the device  
offer a plurality of ways in which to support the patient's  
6 head. One embodiment features a hinged or optionally  
removable lower chin support which is moveable from a first  
position in operable contact with the helmet casing to a  
second position out of such contact, thus allowing the  
surgical team easy access to the entire face and mouth area  
11 for insertion of required tubing into the patients mouth  
and/or nose. The chin support is thereafter reinstalled to  
provide lower chin support with the entire helmet being worn  
by the patient for the rollover procedure on and off the table  
to protect the patient from injury during the course of the  
16 surgical procedure. Or, the chin support may be provided by  
the cushion itself with the cushion and the helmet casing  
extending below the mouth area of the patient thus eliminating  
the detachable chin support.

As the device may be pre-fitted for optimal weight  
21 diffusion and comfort and can be worn during the movement of  
the patient on and off the operating table, the surgical team  
is relieved on concerns of whether the device to hold the face  
and head actually fits the patient. Further, an optional  
rotating handle upon the top of the helmet provides a handy  
26 gripping point for the head for the surgical team to help

- 1 prevent neck injury during roll over of the patient on and off  
the table. By placement of a hand on the face of the mask and  
another on the rotating handle, smooth and continual support  
may be provided to the neck and head area when the patient is  
being rolled over on or off of the operating table.
- 6 Another embodiment of the device features a helmet  
casing, which is best made of substantially transparent  
material, having an interior cavity that is formed to register  
with a cooperatively engageable cushion. The cushion is made  
from foam or other soft resilient material and is dimensioned  
11 on one surface to accommodate the patient's face, and on the  
other opposite or exterior surface, to register with the  
interior cavity of the helmet casing. A raised border about  
the exterior surface perimeter of the cushion could be formed  
during manufacture to provide an additional means to register  
16 and align the cushion with the openings in the helmet casing.  
Optionally, the cushions may be color coded for patient facial  
sizing. One or a plurality of apertures communicating through  
the helmet casing register with appropriately configured  
apertures communicating between the two surfaces of the  
21 cushion and provide an in line cavity from the patient's face  
through the casing. This in-line cavity provides access to  
the patient's mouth, nose, and eyes. By dimensioning the  
cavity to extend around the patients face at eye level, easy  
viewing of the patient's eyes and nose is provided to the  
26 operating room staff.

1       An additional embodiment of the device would feature a  
plurality of legs on the exterior surface of the helmet casing  
to provide a raised mount above the operating table. The legs  
can be adjustable for height above the operating table to  
provide comfortable posture to the patient while affording the  
6 best access and view of the face of the patient to the staff  
of the operating room.

In the current best mode, an optional base may also be  
provided which provides a releasable but solid mount for the  
helmet casing using cooperating fasteners located on the mount  
11 and the exterior of the helmet casing. The mount acts as a  
positioner by providing a stable mount for the helmet casing  
and optionally may provide additional utility in the best mode  
with a surface mounted mirror for providing a reflective view  
of the patient's eyes and nose to the staff of the operating  
16 room while the patient is face down and the staff is  
substantially in an upright position. This eliminates the  
constant need for members of the operating team to bend over  
to inspect the face and eyes of the patient during surgery in  
providing a continuous view of the eyes and face of the face-  
21 down patient. Additional utility is provided by an optional  
light means positioned on the upper surface of the mount  
adjacent to the mirror by illuminating the patient's face  
through the in-line cavity and enlightening the reflection on  
the mirror for the staff to more easily view it from a  
26 distance.

1       An object of this invention is to provide a helmet which prevents injury due to ocular compression during surgery by minimizing ischemic damages through maximal diffusion of pressure about the patient's head.

      Another object of this invention is the provision of a  
6   protective device for use during surgery which allows for pre-fit of the patient prior to surgery while the patient may comment on the comfort or discomfort level of the device.

      A further object of this invention is to provide a protective helmet for surgery which provides a facial and chin  
11 support to the patient which is easily removable by the surgical team for insertion of required devices into the mouth and nose of patient and thereafter easily reinstalled.

      An additional object of this invention is the allowance of easy access to and viewing of, the patients eyes and temple  
16 area through apertures in the device positioned to accommodate such access and viewing.

      Another object of this invention is the provision of a protective surgical helmet of modular construction which allows for positioning of different sized facial cushions and  
21 components into the helmet casing to accommodate the head different sized patients.

      An additional object of this invention is providing an easily sterilized protective helmet through the use of easily sterilized cushions or inexpensive throw away insertable  
26 cushions removably mountable inside an easily sterilized or

1 cleaned helmet shell.

A still further object of this invention is to concurrently provide easy viewing of the eyes and mouth area of the patient while the device is mounted upon the patient.

A still further object of the invention is the provision  
6 of the ability to control and alter the temperature of the device to aid in temperature control of the patient during surgery.

An additional object of this invention is to provide easy viewing of the patients facial features to the operating staff  
11 using while concurrently allows the staff members to remain substantially upright through the provision of a reflective means of the face of the patient.

Further objects of the invention will be brought out in the following part of the specification, wherein detailed  
16 description is for the purpose of fully disclosing the invention without placing limitations thereon.

#### BRIEF DESCRIPTION OF DRAWING FIGURES

Figure 1 is a perspective frontal view of the protective  
21 helmet device showing the chin support in a mounted position.

Figure 2 is a frontal view of the device featuring the hinged repositionable chin support.

Figure 3 is a rear exploded view of the protective helmet device showing the modular pads for the ocular area and chin  
26 support.

1        Figure 4 shows the helmet with detachable and  
repositionable chin support portion.

Figure 5 depicts the helmet with detachable and  
repositionable chin support slidably mountable to the helmet.

Figure 6 depicts a side view of the apparatus showing the  
6 optional handle side grip and the flat face for secure  
positioning on the surgery table.

Figure 7 depicts another embodiment of the device  
featuring an exploded view a helmet casing of unitary  
construction with insertable modular pad providing facial and  
11 chin support in a single combined unit.

Figure 8 depicts the helmet casing of figure 7 in a  
registered position removably or otherwise attached to a mount  
with optionally mirrored surface for reflection of the  
patient's face therein.

16        Figure 9 is a top perspective view of the facial cushion  
showing the facial indentation and apertures therethrough.

Figure 10 depicts and end cut away view of the facial  
cushion for removable mounting to the helmet casing showing  
the facial indentation formed to accommodate patient facial  
21 structures therein, and the lip for registration with the  
casing edge.

Figure 11 depicts a bottom perspective view of the helmet  
casing showing the unitary construction and the legs affixed  
to the exterior which provide an elevated mount along with the  
26 communicating aperture through the casing.

1        Figure 12 depicts a top view of the mounting base for the helmet casing with a surface mounted mirror and light source.

      Figure 13 depicts a side view of the mounting plate with a mirror and cooperatively engageable mounts on the upper surface.

6        Figure 14 is a top view of the upper surface of the mounting plate showing the mirror and mounts.

      Figure 15 is a tope view of the removably attachable heating blanket with temperature control and clip.

11                    **DETAILED DESCRIPTION OF THE PREFERRED**  
                         **EMBODIMENTS OF THE INVENTION**

      Referring now to the drawings, Figure 1 depicts a preferred embodiment of the modularly assembled protective surgical helmet apparatus 10 featuring the helmet casing 12  
16 which is best made from a substantially rigid but easily molded material such as plastic. The plastic casing should also be resistant to the heat or chemicals sufficient to allow for sterilization between uses. The modular version of the helmet casing 12 mates with a chin support 14 using  
21 conventional registering mating positioners such as registration pins 16 which correspond to apertures 18 upon the helmet casing 12. Of course the registration pins 16 and apertures 18 might be reversed in positioning or other  
conventional means of registration and dismountable attachment  
26 may be used to achieve a properly aligned mounting of the chin



1 support 14 to the helmet casing 12. Alternatively, the chin  
support 14 can be slidably mounted to the helmet casing 12  
using a cooperating pair of slide mounts 53 and 51 depicted in  
figure 5 wherein the chin support 14 with one half of the  
fastener slid mount 53 would be lined up with the helmet  
6 casing 12 and cooperating slide mounts 51 and 53 and thereupon  
the chin support 14 would slide onto the helmet casing 12 by  
pushing it into position and interfacing the cooperating slide  
mounts 51 and 53. Cooperating fasteners 20 and 22 in the two-  
piece embodiment, such as hook and loop fabric, are used to  
11 maintain the chin support 14 in operative contact in a first  
position wherein it is in a removably fixed position upon the  
helmet casing 12, however, other conventional mating fasteners  
such as plastic or metal releasable locking fasteners can also  
be used and are anticipated. Cooperating fasteners 20 and 22  
16 would also be used to maintain the hinged chin support 14 and  
slidable chin support 14 in the first position of operable and  
registered contact with the helmet casing 12 although in the  
case of the slidable version friction alone in the cooperating  
slides may be sufficient to releasably hold the chin support  
21 14 in proper contact with the helmet casing 12.

The dismountable chin support 14 may also be attached to  
the helmet casing 12 at one end using a conventional metal or  
plastic hinge fastener 34 such that the chin support 14 will  
swing away from its first position in operative contact in a

1 registered mounting with the helmet casing 12. This  
embodiment allows for easy access to the patient's facial area  
during surgery or emergencies while maintaining the chin  
support attached to the helmet casing 12 when swung to the  
second position out of operative contact with the helmet  
6 casing so as to avoid loss of the chin support 14.

Straps 24 having cooperating fasteners 25 at their distal  
ends securable to mating cooperating fasteners 25a upon the  
helmet casing 12 may be optionally used to secure the helmet  
casing 12 upon the face of the patient once the properly sized  
11 ocular cushion 26 has been removably mounted into the helmet  
casing 12.

In certain instances the helmet casing and chin support  
might also be formed as one piece for surgeries where a  
removal of the chin support 14 is not a major consideration  
16 and for ease of use and reduction in parts to inventory. In  
such a one piece embodiment the support to the face of the  
patient provided by the ocular cushion 26 and chin cushion 28  
would be provided by a single once piece facial cushion 31  
which is configured to removably mount into a one piece  
21 embodiment of the helmet casing 12 in a registered position,  
therein thereby providing stable even support the entire face  
of the patient from forehead to chin. In the one piece  
version of the helmet casing 12 the front surface would be  
extended to a point below the chin and thereby accommodate a

- 1 once piece facial cushion 31 and apply complete support to the head of a patient.

The ocular cushion 26 and chin cushion 28, or one piece facial cushion 31, if reusable, are best made of a closed cell foam material or other cushioning material which does not absorb fluid easily to allow the cushions to be sterilized in the conventional fashion for reuse. In many instances sterilization may not be necessary and a simple washing may provide the required level of cleanliness. In such cases the material used will be durable for reuse and resistant to cleaning to allow multiple uses of the cushions 26, 28, or 31. However, for ease of use and to maintain a highly sterile field about the patient, disposable ocular cushions 26, chin cushions 28, and one piece facial cushions 31 may be more desirable since they could be used once and replaced after each operation to maintain a highly sterile or sufficiently clean field. The best mode as to disposable or reusable is best determined by the criteria of the hospital or surgery center involved and their individual criteria.

Optionally, for an even more custom fit to individual patients is desirable, the ocular cushion 26 and chin cushion 28 or the once piece facial cushion 31 may also be made inflatable with gas or fluid or silicone or other gel such that they may be adjusted in size and flexibility by filling them with a gas or liquid into the cushions through a sealable orifice communicating through the wall of the cushion.

1       The ocular cushion 26 may be made in a set of multiple  
ocular cushions 26 varied in dimensions of both thickness and  
width and have variable sized and located ocular apertures 27  
therein to best accommodate the size and facial structure of a  
variety of differing sized individuals using the same helmet  
6 casing 12. The chin cushions 28 may also be from a set of such  
chin cushions 28 varied in dimensions of both thickness and  
width to achieve optimum fit on individual patients. The one  
piece facial cushion 31 used with the one piece embodiment of  
the helmet casing 12 provides the same adjustable utility and  
11 can be varied in the same fashion by providing multiple facial  
cushions 31 for use as a kit to be combined with one piece  
helmet casing 12. The facial cushion 31 has a facial  
indentation 35 formed on a first side of the facial cushion 31  
sized to accommodate the face size of the intended patient.  
16 The opposite side or exterior surface 38 of the facial cushion  
31 would be dimensioned for cooperative engagement with the  
interior surface 35 of the one piece embodiment of the casing  
12. By varying the dimensions of the cushions 26 and 28 or  
31, and the size and location of the apertures therein, and  
21 matching them to the properly sized one or two piece helmet  
casing 12, virtually any adult or child may be fitted to wear  
the resulting assembled device 10 comfortably with optimal  
support of the facial structure of the cranium and maximal  
diffusion of pressure and weight about the face and sides of

1 the patient's head to obviate injury to the eyes and face and  
nerves.

In the two-piece embodiment, the ocular cushion 26 and  
the chin cushion 28 are attached to the helmet casing 12 and  
repositionable chin support 14 respectively, using a means of  
6 attachment such as corresponding mounts 32 formed of hook and  
loop fabric or adhesive pad fasteners mounted on the cushions  
26 and 28 in positions to contact corresponding cooperating  
mounts 33 on the respective interior surfaces 35 and 36 of the  
helmet casing 12 and chin support 14. However, adhesive  
11 mounting does not require using cooperating mounts 32 and 33.  
In this manner using adhesion, adhesive, two-sided tape,  
adhesive pads, adhesive covered by an easily removable paper,  
or similar conventional adhesive attachments can be placed  
between the cushions 26 and 28 and the inside faces of the  
16 helmet casing 12 and chin support 14. A frictional engagement  
between the facial cushion 31 and interior surface 35 of the  
one piece embodiment of the helmet casing 12 would also  
provide a means of attachment therein using the weight of the  
patient's head to maintain registration of the facial cushion  
21 31 in the casing 12 and in such a use of components optional  
retaining tabs 43 could be provided as an additional means of  
attachment of the facial cushion 31 to the helmet casing 12 to  
insure that it stays registered therein.

1        When using a disposable form of cushions 26 and 28, and 31  
adhesive or other means for a removable attachment can be  
placed upon the helmet side of the respective cushion surface  
for an easy mount of the cushions into the helmet casing 12  
and/or repositionable chin support 14. Such a disposable form  
6 of cushions 26, 28, and 31, would be kept sterile inside a  
sealed wrapper in the conventional manner and removed and  
mounted to the inside face or interior surfaces 35 and 36 of  
the helmet casing 12 and chin support 14 respectively as  
necessary in the configuration decided upon, using  
11 conventional peel and stick adhesive pads positioned upon the  
surface of the cushions to attach them to the helmet interior  
surface 35.

.The device 10 offers great utility to the user since it  
is capable of using either disposable or reusable cushions for  
16 cushions 26, 28, or 31, or combinations thereof at the  
discretion of the professional using the device. Where  
disposable cushions are desirable due to their ease of use and  
lack of the need for sterilization, just the helmet casing 12  
and chin support 14, if used, need be sterilized. Or, in the  
21 case of the once piece casing just the casing need be  
sterilized if required. However, a reusable form of cushions  
26, 28 and 31 may also be used in the device 10 where the  
cushions can be sterilized between use, or, in instances where  
sterilization is determined not to be needed they need only be

1 washed. Or, a combination of reusable and disposable cushions  
26, 28 and 31 may be used should such be desired or required  
if a reusable cushion is lost or damaged.

In use, with the two-piece embodiment, the patient would  
be measured for the optimum helmet casing 12 size which would  
6 be chosen from a plurality of available interchangeable helmet  
casings available, and, a chin support 14 of proper size which  
would be chosen from a plurality of interchangeable chin  
supports capable of attachment to said casing 12. Also chosen  
to accommodate differing facial and head dimensions would be  
11 the properly dimensioned cushions 26 and 28, from a set of  
interchangeable cushions, to allow the patient maximum comfort  
and diffusion of pressure about the surface of the face and  
side of the head. The patient could be given samples of the  
different sizes of cushions 26 and 28 from a set of variable  
16 dimensioned cushions 26 and 28 to which the patient would give  
input as to the best possible fit or a medical technician  
might also help determine the optimum casing and cushion  
dimensions with or without the patient's input. This  
availability of an assortment of cushions and assembled helmet  
21 sizes allows for a modular system of helmet casings 12 and  
attachable chin supports 14 assembled to the helmet, to be  
used in conjunction with the desired dimension of cushions 26  
and 28, also from a set of such cushions of differing  
dimensions, to achieve the optimum fit on a variety of sizes

1 of patient heads.

Once the optimum dimensions of the cushions 26 and 28 are determined, yielding a comfortable fit and maximal pressure distribution about the face and sides of the head, the cushions 26 and 28 are removably mounted into the interior of both the helmet casing 12 and chin support 14 using the aforementioned adhesive or fastener cooperating mounts 32 located upon the cushions which attach to cooperating mounts 33 which are positioned upon the helmet casing 12 and chin support 14 respectively. This is accomplished in a manner to allow for the mounting the cushions 26 and 28 into the cooperatively configured interior surfaces 35 and 36 of the helmet casing 12 and chin support 14 respectively.

The inside surface 35 of the helmet casing 12 features a casing ocular aperture 37 and the chin support 14 has a chin support aperture 39. When properly positioned in the cooperating inside faces of the helmet casing 12, the aperture 27 in the ocular cushion 26 will be relatively in line with the casing ocular aperture 37 such that the eyes and nose and some surrounding portions of the patient's face, or the ocular area of a patient's face, may be easily viewed through the ocular aperture 37 when the device 10 is being used during surgery after being positioned upon the patient's face. The ocular aperture 27 might best be made slightly larger than the casing ocular aperture 37 to allow for easy mounting of the



1 ocular cushion 26 into the helmet casing 12 to allow for the  
patient's eyes and surrounding skin area to be viewed through  
the casing ocular aperture 37 and relatively in-line cushion  
ocular aperture 27. Where the casing ocular aperture 37 wraps  
around to the side of the helmet casing 12, the in-line ocular  
6 cushion aperture 27 would also wrap around in a relatively in-  
line position with the casing ocular aperture 37. This in  
line relationship of apertures creates a viewing passage  
communicating through the helmet casing 12 and apertures 37  
and 27 thus revealing the patient's temple area of the head in  
11 addition to the ocular area of the face and the nose. This in  
line relationship of the apertures of the cushions 26 and 28  
with the casing apertures 37 and 29 also allow for the passage  
of conventionally used tubes through the in line apertures  
into the patient's nose and/or mouth for providing life  
16 support during the operation. Further, the cavity formed by  
the in line cushions 26 and 28 attached to the helmet casing  
12 and chin support 14 gives protection to these tubes at the  
critical entry and exit positions on the patient at the nose  
and mouth such that the tubes, inside the cavity, will not  
21 bend to a point where flow therethrough is interrupted with  
possible life threatening consequences to the patient. For  
additional utility, optional tube passages 44 communicating a  
tubular passageway from the interior of the device 10 to the  
exterior, can provide for communication of tubes or sensing

1 device wires therethrough to the patient. Exterior mounted  
optional tube positioners 46, of hook and loop fabric or other  
type of fastener suited to the job, can be optionally mounted  
upon the exterior of the device 10 to hold tubing and/or wires  
for monitoring the patient operatively therein during surgery.  
6 Snap on fasteners may also be optionally attached at the  
exterior of the device 10 to hold tubing and the like. By  
providing optional strategically placed snap mounts 48 the  
snap on fasteners may be placed in differing positions about  
the exterior to hold the tubing and/or wiring required for  
11 certain surgical procedures in place and out of harms way.

The chin support aperture 39 of the two-piece embodiment  
lines up with the bottom of the casing ocular aperture 37 when  
the dismountable chin support 14 is operably mounted to the  
helmet casing 12. The chin support aperture 39 allows for  
16 viewing and access to the lower mouth area of the face of the  
patient with the chin of the patient being supported by the  
chin aperture 29 in chin cushion 28 removably attached to the  
interior surface 36 of the chin support 14.

Added utility is provided by the device 10 operably  
21 mounted to the face of the patient using attributes of the  
frontal surface 41 of the device 10. This frontal surface 41  
if made flat like that of the upper table surface 64 of a  
conventional operating table, allows for a stable support of  
the patients face inside the properly mounted device 10 when

1 the frontal surface 41 is placed upon the operating table  
without a mount if such a positioning is desired. For  
especially stable maintenance of the patient's head when in a  
sideways position a second side flat surface area on the  
sidewall 47 area may be located on one or both sidewalls 47 of  
6 the device 10.

Or, as depicted as the one-piece embodiment of the device  
in figure 7, legs 60 attached to the casing exterior surface  
49 can provide both a means for elevation of the helmet casing  
12 above the couplings 62 on the mounting plate 66 and  
11 underlying table surface 64 and if desired, registration using  
at least two of the couplings 62. The couplings 62 as  
depicted, are dimensioned to cooperatively engage the distal  
ends of the legs 60 and can be mounted directly to the  
operating table surface 64 using a means for attachment to the  
16 operating table surface 64 such as adhesive 65, frictional  
engagement, or other means of attachment to the table surface  
64. Or in the current best mode a mounting plate 66 would  
have the couplings 62 mounted thereon positioned to provide a  
registerable mount through cooperative engagement with an  
21 axial leg aperture 63 in the distal end of the legs 60.

Insertable leg extensions 61, made of differing lengths to  
achieve the desired elevation, provide an adjustable means for  
elevation would fit between the leg apertures 63 and onto the  
couplings 62 providing a means for height adjustment of the

1 helmet casing 12 above the underlying table surface 64 to  
accommodate various posture positions for the patient's head  
and neck.

The single piece embodiment of the helmet casing 12 features a front wall surface 41 which extends laterally and  
6 then curves to a pair of side walls 47 both of which begin at one side with their communication with the front wall surface 41 and extend vertically at an acute angle from the front wall surface 41 to form the two substantially parallel sidewalls 47. In this embodiment the casing ocular aperture 37 in the  
11 current best mode, is enlarged and extended around and through the front wall surface 41 and upward onto and through at least one side surface 47 of the helmet casing 12 providing a clear view of the patients eye, and face in the temple area, as well as the area in front of the nose, from one or both sides of  
16 the device 10. Extending the casing ocular aperture 37 and the cushion ocular aperture 27 up at least one sidewall 47, whether they are used in combination or when the cushion might be used by itself, thus provides a means to view the eye socket and surrounding area through the sidewalls 47 of the  
21 device of the patients who might use the device. In the current best mode, the ocular apertures of both the once piece helmet casing 12 and the facial cushion 31 extend up both sidewalls 47 to provide a viewing passage 82 of both eyes and the surrounding temple area of the head of the patient through

1 the sidewalls 47. Viewing of the temple area is also achieved  
through the transparent material making up the helmet casing  
12 and would allow for a larger ocular cushion aperture 27 to  
provide more of a view of this area thus allowing even greater  
viewing of the patients eye area much like a window.

6 . During times of moving of the patient for roll over or  
off of the surgical table and onto a gurney, an optional top  
handle 40 attached to the top area of the helmet casing 12  
portion of the assembled device 10 allows medical personnel a  
solid gripping point for providing head and neck support to the  
11 patient while being rolled over or otherwise moved. By  
holding the patient's neck with one hand and the handle 40 in  
the other, essential support can be provided to avoid injury  
to the anesthetized patient. A roller or ball or other  
conventional bearing 42 can also be placed at the base of the  
16 handle 40 should easy rotation of the handle 40 be desired  
during use. Such a rotation of the handle 40 on the bearing  
42 allows for a smooth roll over of the patient with the  
patient's neck concurrently supported, thus minimizing  
possible neck injuries during roll over and other hazardous  
21 patient relocation procedures.

Additional utility in the disclosed apparatus herein is  
provided by the insulating factor provided to the patient  
wearing the surgical helmet 10 and cushions 26, 28, and 31,  
when mounted upon the face of the patient during a surgical  
26 procedure. Operating rooms are conventionally kept quite cold

1 to keep medical personnel and surgeons cool and alert during  
surgical procedures. The patient however is generally  
unclothed during such procedures and can suffer discomfort  
from the overly cool environment of the room. The cushions  
26, 28 and 31, form to the face of the patient and are mounted  
6 upon the interior surface 35 of the device 10, and thereby  
encompass the face and part of the sides and top of the head  
of the patient. The result being that the face, sides, and top  
of the patient's head are insulated from the cool room  
temperature, helping to keep the patient warmer in the  
11 unnaturally cool environment of the operating room.

Further utility is also provided by this surgical helmet  
device 10 through the use of optional slot passages 45 located  
in the face of the device for positioning of tubes therein.  
During a surgery requiring the patient to lay face down, tubes  
16 providing breathing supplies to the patient may be positioned  
in a slot configured to allow the tube to recess therein such  
that the tube will not collapse when the patient is face down  
and the tube is between the table and casing exterior surface  
49 of the device 10. Such a slot passage or multiple slot  
21 passages 45 may be positioned about the face of the helmet in  
other locations than shown.

Figure 7 depicts a preferred embodiment of the device 10  
featuring an exploded view showing the helmet casing 12 of a  
one piece or unitary construction. In this embodiment, the  
26 casing walls are best constructed of rigid substantially

1 transparent material such as plastic in a unitary  
construction. This embodiment provides the same desired  
support for the chin and face provided by the two-piece  
embodiment accomplishing this support with a cooperatively  
engageable one piece facial cushion 31. This one piece  
6 embodiment continues to provide proper chin and face support  
by slightly elongating the helmet casing 12 in a one piece  
design and combining the ocular cushion 26 and chin cushion 28  
into a one piece facial cushion 31 which is dimensioned on the  
exterior surface 70 of the facial cushion 31 for cooperative  
11 engagement with the interior surface 35 of the helmet casing  
12. The facial cushion 31 is dimensioned on the interior  
surface 69 to provide a comfortable fit to the face of the  
patient for which it is to be used. In use, in essentially  
the same manner as the two-piece embodiment, the intended  
16 patient would be measured for the optimum facial cushion size  
31 which would be chosen from a plurality of available  
interchangeable facial cushions 31 available for registered  
cooperative engagement with the one piece helmet casing 12.

In many cases only one or two different sized helmet  
21 casings 12 would be needed in inventory to be mated with  
cushions to accommodate a very large number of differently  
dimensioned facial cushions 31 since the size, thickness, and  
exterior and interior dimensions of the facial cushion 31 may  
be varied to accommodate the different facial dimensions of

1 different patients. This is accomplished by the variance of  
the dimensions of the indentations 68 formed on the interior  
surface 69 of the facial cushion 31 which are used accommodate  
the facial dimensions of the intended patient. The exterior  
surface 70 of the facial cushion 31 would be dimensioned for  
6 operative cooperative engagement with the shape and dimensions  
of the interior surface 35 of the helmet casing 12 in the  
aforementioned registered and cooperative engagement therein.

The registration and cooperative operative engagement  
between the cushion 31 and helmet casing 12 would be  
11 maintained using a means for registered engagement of the  
facial cushion 31 with the helmet casing 12 which includes  
one, or a combination, of registration means, from a group of  
such registration means consisting of frictional engagement  
between the interior surface 35 of the helmet casing 12 and  
16 exterior surface 70 of the facial cushion 31, adhesive 65, a  
lip 71 located about the upper exterior surface 70 of the  
facial cushion 31 in a position to cooperatively engage the  
upper edge 75 of the sidewalls 47 of the helmet casing 12, or,  
registration pins 73 attached to the body of the facial  
21 cushion 31 in positions to cooperatively engage registration  
apertures in the casing, in this case axial passages 77 formed  
into the legs 60 and sized to accept the registration pins 73  
in a removable cooperative engagement. Since the registration  
pins 73 would in the current best mode be molded of the same



1 flexible foam as the facial cushion 31 they offer the current  
best mode of registration since the registration pins 73 will  
compress during insertion into the axial passages 77 and then  
naturally bias against such compression into removable biased  
frictional engagement with the interior of the axial passages  
6 77. While the aforementioned are the current best mode of a  
registration means between the facial cushion 31 and the  
helmet casing 12, those skilled in the art may devise other  
such means of registered engagement and such are anticipated.

In fitting the patient for maximum comfort and support,  
11 the patient could be given samples of the differently  
dimensioned facial cushions 31 from an available plurality or  
set of variably dimensioned facial cushions 31 to which the  
patient would give input as to which formed indentations 68  
provide the best possible fit to the facial dimension of the  
16 patient. Or, a medical technician might also help determine  
the optimum helmet casing 12 and facial cushion 31 dimensions  
with or without the patient's input. This availability of an  
assortment of differently dimensioned facial cushions 31 to  
cooperatively and operatively engage one or a plurality of  
21 helmet casings 12, allows for a kit or modular system of  
helmet casings 12 and attachable to facial cushions 31 to  
achieve the optimum fit on a variety of sizes of patient  
heads. For easy identification of size the facial cushions 31  
would be marked with appropriate indicia 30 in writing showing

1 a size designation or in the best current mode with indica in  
the form of color coding for easy identification. The color  
coding or written indica 30 to identify size could be imparted  
by extruding it in the color of the foam making up the facial  
cushion 31 or silkscreened or otherwise applied on the surface  
6 of the cushions 26, 28, and 31. Once the optimum dimensions  
of the facial cushion 31 are determined, yielding a  
comfortable fit and maximal pressure distribution about the  
face and sides of the patient's head, the facial cushion 31 is  
removably mounted to the interior of the helmet casing 12  
11 using the aforementioned means for registered engagement of  
the facial cushion 31 with the helmet casing 12.

The one piece facial cushion 31 offers an additional  
benefit in that in some cases it might be used without the  
helmet casing 12. Use without the casing might occur when an  
16 especially low mount of the patient's head is desired for  
posture or for the surgical procedure, or, in an emergency or  
other situation where the additional support and utility of  
the in-line helmet casing 12 is not required. Use of the  
facial cushion 31 by itself, while not offering the full  
21 utility of the best mode in combination with the helmet casing  
12, does provide the easy side viewing of the patients eyes  
through the elongated ocular cushion aperture 27 and still  
provides improved support and padding to the patient's head  
during surgery. Consequently, it is anticipated that the

1 cushion might be used alone without the casing 12, and while  
not providing all of the utility of the device featuring the  
combination of the facial cushion 31 with the helmet casing  
12, using the cushion alone would still provide much better  
support to the patient's face, a clear view of the eyes  
6 through the elongated cushion ocular aperture 27 and a solid  
support to the patient's head on the table through frictional  
engagement therewith.

Or, in some cases, where reuse of the cushion may not be  
advisable due to the patient, the helmet casing 12 might also  
11 be formed into the exterior of the facial cushion 31 itself.  
This could be done if a substantially rigid shell 80 were  
formed about the exterior surface 70 of the facial cushion 31  
by either lamination thereto or in the molding process and  
would provide rigid support to the facial cushion 31. However  
16 this configuration with the helmet casing 12 as attached to  
the facial cushion 31 as a laminated or permanent shell yields  
less utility in that different facial cushions 31 for  
different sized patients could not be matched to a single  
helmet casing 12 thus requiring more stock of product. But,  
21 differing user criteria and requirements may call for the  
facial cushion 31 to be thus used and manufactured with a  
casing formed by the rigid shell 80 formed on the outside  
surface for use without the additional advantages afforded by  
mating with the helmet casing 12 and such is anticipated.

- 1 While the current best mode of the device, affording the most  
utility, is the registered engagement of a properly sized  
facial cushion 31 with the helmet casing 12, the cushion-only  
embodiments offer the operating staff the option to use the  
facial cushion 31 without the helmet casing 12 and still  
6 achieve much better support of the patient's head, thermal  
insulation and view of the patient's eye and surrounding  
temple area 74 which is a marked improvement to the current  
practice of placing the head on a towel. The very nature of  
the exterior surface 70 of the soft foam facial cushion 31  
11 would provide a good frictional mount to the surface of the  
table surface 64 and good side and frontal support to the head  
of the patient with a concurrent view through the elongated  
casing ocular aperture 37 reaching around the side to allow a  
view of the patient's eye socket from an operative distance.  
16 Use of the facial cushion 31 could also occur if there were a  
shortage of helmet casings 12 for the number of patients  
requiring surgery during an emergency situation. Consequently  
it is anticipated that the facial cushion 31 could be used by  
itself in certain instances and would still be a substantial  
21 improvement for a mount and support of the patient's head than  
the present art.

To provide an excellent view of the patient's facial  
features, as with the two piece embodiment, the interior  
surface 35 of helmet casing 12 features a casing ocular  
26 aperture 37 communicating through the casing front wall 41

1 surface and side walls 47 and the chin support aperture 39  
formed into the front wall 41 surface and communicating  
therethrough. The one piece embodiment the helmet casing 12 as  
noted also features an elongated casing ocular aperture 37  
which wraps around the helmet casing 12 to determined  
6 termination points in one or both substantially parallel side  
walls 47, and thus allow for easy viewing of the eye area of  
the patient during use by looking through the in line casing  
ocular aperture 37 and cushion ocular aperture 27. In the one  
piece embodiment this casing ocular aperture c communicates  
11 with the chin support aperture 39 to yield a somewhat figure  
eight shaped aperture when the casing is viewed from the  
bottom. The in line ocular cushion ocular aperture 27 where  
it intersects the cushion chin support aperture 39, yield a  
nasal cavity 57 the area of which is defined by the thickness  
16 of the wall surface of the facial cushion 31 and the perimeter  
of the intersecting chin support aperture 39 and the cushion  
ocular aperture 27. Along with providing a passageway for  
tubes to the patient, the nose cavity 57 also yields a good  
view of the nose and facial area around the nose when the  
21 patent is in the prone position, providing additional utility  
to the device.

When properly positioned, the cooperating engagement of  
the facial cushion 31 and helmet casing 12, will place the  
cushion ocular aperture 27 substantially in line in a

1 registered position in relation to the casing ocular aperture  
37. The ocular cushion ocular aperture 27 might best be made  
slightly larger than the helmet casing ocular aperture 37. This  
slight increase in size provides for easy mounting of the  
facial cushion 31 into the helmet casing 12 to a position to  
6 allow the patient's eyes and surrounding skin area to be viewed  
through the wrap around casing ocular aperture 37 and  
relatively in-line cushion ocular aperture 27. When the helmet  
casing 12 is substantially transparent material, as in the  
current best mode, the increased size of the apertures of the  
11 facial cushion 31 also increase the area around the eyes and  
nose of the patient that can easily be viewed since these areas  
may be viewed through the helmet casing 12 itself.

As noted, in the current best mode, the casing ocular  
aperture 37 wraps around from the front to both sides of the  
16 helmet casing 12. The ocular cushion aperture 27 would also  
wrap around substantially the same such that when mounted it  
would engage the casing ocular aperture 37 in a relatively in-  
line position, registered with the ocular casing aperture 37. A  
viewing passage 82 provides a means to view the eyes and nose  
21 and some surrounding portions of the patient's face through the  
sidewall 47 is thus defined and provided by the in-line  
relationship of the wrap around facial cushion ocular aperture  
27 and the casing ocular aperture 37 and the cushion chin  
support aperture 39 and the casing chin aperture 29 thus

1 forming the viewing passage communicating through the helmet  
casing 12 and the apertures in the facial cushion 31 providing  
an excellent view of the patient's temple area of the head in  
addition to the ocular area of the face and a nose cavity 57  
for accommodating and viewing the nose from both sides of the  
6 device and well as from below the device when mounted on the  
operating table. This in-line relationship of the cushion  
apertures 27 and 39 with the casing apertures 37 and 29 also  
allows for the passage of conventionally used tubes through the  
in line apertures into the patient's nose and/or mouth for  
11 providing life support during the operation.

Figure 8 depicts the facial cushion 31 inserted and  
registered in position with the helmet casing 12 which is in a  
registered position removably attached to an optional mount  
plate 66 using couplings 62 configured to cooperatively engage  
16 the distal ends of the legs 60 which are attached to the helmet  
casing 12 at their opposite ends. The couplings 62 are depicted  
as pins that insert into indents in the legs 60 but this  
arrangement could be reversed with the legs positionable into  
indents in the mounting plate 66 or other means for attachment  
21 of the legs 60 to the couplings 62 could be used and are  
anticipated. If needed to adjust the height of the helmet  
casing 12, and thus the height of the head of the patient for  
comfort or function, one or a plurality of leg extensions 61  
may be used to adjust the height as desired. The leg extensions

1 61 would of course be configured to operatively engage in a fit  
between the legs 60 and the couplings 62.

The couplings 62 alone using adhesive or other manner of  
attachment could be pre-installed to the operating table  
surface 64 in cases where the optional mounting plate 66 is not  
6 desired, however in the current best mode, the mounting plate  
66 positioned on the operating table surface 64 would provide  
the couplings 62 attached in positions to cooperatively engage  
the distal end of the legs 60 to thereby provide a stable means  
of elevated attachment of the helmet casing 12 above the table  
11 surface 64 in registered engagement with the mounting plate 66.

By the provision of a means for elevation, through the  
provision of legs 60 to slightly elevate the helmet casing 12  
above the operating table surface 64, and the means for  
elevation adjustment using the leg extensions 61, or other  
16 manner of extending the length of the legs 60 such as  
telescopic legs, or legs extending with pins to hold the  
elongation of the legs, better patient posture is achieved by  
keeping the patient's neck in line. Elevating the helmet  
casing 12 and patient therein also elevates the casing ocular  
21 aperture 37 and casing chin aperture 29 thereby allowing better  
views therethrough of the patient for direct viewing by the  
staff. The casing ocular aperture 37 being extended around the  
frontal area and communicating between the casing interior  
surface 35 and casing exterior surface 49 and extending to the



1 side area of the helmet casing 12, provides an easy and clear  
view of the patients eye and temple area 74. For additional  
utility, the aforementioned optional tube passages 44 could be  
operatively positioned in the once piece embodiment of the  
helmet casing 12 to provide a tubular passageway from the  
6 interior of the device 10 to the exterior for the various  
devices requiring such.

While elevating the helmet casing 12 provides extra room  
between the table and the in-line apertures to allow better  
viewing of the patient from the side and below, in the current  
11 best mode, the placement of a mirrored surface 72 on the upper  
surface 67 of the mounting plate 66 provides additional utility  
through the provision of a means for the upright operating  
staff to view of the patients eyes and temple area around the  
eye, through the in line ocular and chin apertures 29 and 37.  
16 Normally the doctor or staff member wishing to view the  
patient's eyes area adjacent to the eye temple area 74 or face  
would have to stoop to an angle wherein they can be seen  
through the in line apertures in the helmet casing 12 from the  
side, or in some cases from below the operating table.  
21 However, with the provision of a mirrored surface 72,  
operatively placed on the upper surface 67 of the mounting  
plate 66, the doctors and staff are afforded a means for a  
continuous real time view while standing, of the patient's eyes  
and mouth through the apertures 37 and 29 in the helmet casing

1 12. Should even more adjustability of the reflection be  
desired so that certain staff in certain positions can see the  
patient's eyes and mouth, a means for angular adjustment of the  
mirrored surface 72 could be attached between the mounting  
plate 66 and the mirrored surface 72 such as a ratchet 78 or  
6 other conventional means for angular adjustment that will  
provide the user with the ability to adjust the angle of the  
mirrored surface 72 from substantially parallel to the mounting  
plate 66 toward a position normal to the mounting plate 66.  
The mirrored surface 72 with the means for angular adjustment  
11 thus may be positioned to an infinite number of angles between  
positions parallel and normal to the mounting plate 66. Such  
adjustment provides substantial utility to the operating room  
staff and doctors by allowing them to adjust the mirrored  
surface 72 to obtain the best possible view of the patient  
16 through the in line apertures of the facial cushion 31 and  
helmet casing 12.

Should additional enhancement of patient viewing be  
desired, the addition of the optional illumination means in the  
current best mode in the form of light 76 which further  
21 enhances the reflected view in the mirrored surface 72 by  
illumination of the patient's facial features which reflect in  
the mirrored surface 72. The illumination means could be a  
conventional light bulb, a light emitting diode, or other  
similar light sources and can be powered by conventional AC or

1 battery power that is readily available in the operating arena.

Construction of the one piece embodiment of the facial cushion 31 and the various options thereto, is best depicted in figure 9 and Figure 10. As shown from the top perspective view of figure 9, the indentations 68 to accommodate various sized  
6 faces and facial structures are operatively positioned and provide excellent head support in the form of a forehead support 54, cheek supports 55 and chin support 56. The registration pins 73 protrude from the exterior surface 70 in positions to register the facial cushion 31 in operative  
11 engagement with the leg axial passages 77 extending axially through the legs 60 of the one piece embodiment of the helmet casing 12. Registered insertion of the facial cushion 31 into the helmet casing 12 is thus easily achieved by the in line cooperative engagement of the registration pins 73 with the  
16 axial passages 77 in the legs 60. Of course the other aforementioned means of registration of the facial cushion 31 with the helmet casing 12 might also be used including the lip 71, adhesive 65, or frictional engagement of the exterior surface 70 of the facial cushion 31 with the interior surface  
21 of the helmet casing 12. In cases where the additional utility of the helmet casing 12 encompassing the facial cushion 31 is not required the facial cushion 31 could be used alone in a frictional engagement with the surface of the table surface 64.

1        Figures 11 and 12 provides a bottom perspective view and a  
top perspective view respectively, of the one piece embodiment  
of the helmet casing 12. As shown, the legs 60 contain the  
axial passageway 77 therein communicating with an leg aperture  
63 at each end for registered engagement of the molded  
6 registration pins 73. The elongated casing ocular aperture 37  
in the one piece casing extends across the bottom and up both  
sides of the one piece helmet casing 12, and communicates with  
the chin aperture 29 to form a single large "t" or figure eight  
shaped aperture which registers in an in-line relationship with  
11 a similar shaped and slightly larger aperture in the one piece  
facial cushion 31. Also depicted are a pair of optional tube  
passageways 50 providing communication to the interior of the  
helmet casing 12 through axial tube passages 52 therein.

A preferred embodiment of the mounting plate 66 component  
16 is depicted in figures 13 and 14. The mounting plate 66 in the  
current best embodiment is constructed of rigid plastic such as  
polycarbonate, which is substantially transparent. A plurality  
of couplings 62 are attached to the upper surface 67 of the  
mounting plate 66 to provide the registered mount for the legs  
21 60 of the helmet casing 12. In this embodiment, rather than  
having the mirrored surface 72 on the upper surface 67 of the  
mounting plate 66 the mirrored surface 72 is adhered to the  
bottom surface 83 of the mounting plate 66. Adhering the  
mirrored surface 72 to the mounting plate bottom surface 83

1 facing upward toward the tope surface, allows the mirrored  
surface 72 to provide the desired reflection of the patients  
face through the substantially transparent plastic material of  
the mounting plate 66 while concurrently protecting the  
mirrored surface 72 from scratching. In this embodiment the  
6 mirrored surface 72 may be adhered to the bottom of the  
mounting plate 66 by using mirror attached into an indent in  
the bottom surface 83 or by applique of a metalized or  
reflective surface to the bottom surface 83 such that when  
viewed through the substantially transparent material making up  
11 the mounting plate 66 from the upper surface 67 a reflection is  
provided. The depicted optional outwardly biased conventional  
plunger ball 85 would provide additional stability to the  
couplings 62 in their cooperating engagement with the legs 60.

Additional utility during procedures where the temperature  
16 of the patient is a concern is provided by the optional  
removably attachable means for heating the head of the patient.  
In the current best embodiment the means for heating the head  
of the patient is provided by a removably attachable heating  
blanket 87 as depicted in figure 15. The heating blanket is  
21 removably attachable to the helmet casing 12 using biased clip  
90 which is spring loaded and attaches to an upper edge of the  
helmet casing 12. The heating blanket 87 provides heat using a  
resistive element 92 which heats the blanket body 93 when power  
from an electrical power source 94 is communicated thereto

1 through conventional wires 96. The heat is distributed evenly  
by the serpentine arrangement of the resistive element 92 thus  
avoiding hot spots. Control of the amount and duration of heat  
would be provided by a conventional thermostat 98 engagement  
with the resistive element 92 to break the circuit when the  
6 desired temperature is obtained. The wires 96 might also be a  
flat strip style wire that is applied to the exterior surface  
70 of the helmet casing 12 and an interface on the clip 90 such  
that attaching the clip 90 to the helmet casing 12 would also  
provide power to the blanket 87 through the interface in the  
11 clip 90. Alternatively, in some cases it may be more  
advantageous to attach the resistive element 92 by affixing it  
or appliqueing it to the interior surface of the helmet casing  
12 in between the facial cushion 31 and the helmet casing 12  
where it would work in the aforementioned fashion but provide  
16 heat to the face of a prone patient or the back of the head of  
a supine patient using the disclosed device.

While all of the fundamental characteristics and features  
of the protective cushion and cooperatively engageable helmet  
casing for anesthetized patient have been shown and described,  
21 it should be understood that various substitutions,  
modifications, and variations may be made by those skilled in  
the art without departing from the spirit or scope of the  
invention. Consequently, all such modifications and variations  
are included within the scope of the invention as defined by  
26 the following claims.